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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,740	09/06/2006	Takeshi Hikata	017700-0187	3133

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EXAMINER	
CULBERT, ROBERTS P	
ART UNIT	**PAPER NUMBER**
1792	

MAIL DATE	DELIVERY MODE
03/31/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/591,740	HIKATA, TAKESHI	
	Examiner	Art Unit	
	Roberts Culbert	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/6/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claim 1, diameter-reduction processing is not defined by applicant and is not an art recognized term. Thus, one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Regarding Claim 2, the claim is run together such that it is unclear what the relationship is between the non-catalyst material and a material not having a substantial catalytic function. The object of the phrase "of a columnar shape having said crystal growth surface as a top surface" is unclear. Further, since Claim 2 recites the limitation as "said catalyst material having columnar shape". There is insufficient antecedent basis for this limitation (columnar shape) in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,114,641 to Yamamoto et al.

Regarding Claim 1, Yamamoto et al. teaches catalyst base is formed by diameter-reduction processing.

The limitations of "producing a carbon nanostructure wherein a carbon crystal is grown by vapor phase epitaxy from a crystal growth surface of a catalyst reads broadly on an intended use of the processed catalyst as broadly recited.

Regarding Claim 1, Yamamoto et al. teaches diameter reduction processing may be drawing, extrusion, rolling, forging etc.

Claims 1, 10 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,146,227 to Mancevski.

Regarding Claim 1, Mancevski teaches a method of producing a carbon nanostructure wherein a carbon crystal is grown by vapor phase (*vapor deposition*) from a crystal growth surface of a catalyst base (*see crystalline catalyst materials precipitating carbon to form a nanotube)* including a catalyst material, wherein said catalyst base is formed by diameter-reduction processing. (*reads at least on NCRS diameter reduction processing*)

Regarding Claim 10, Mancevski teaches the catalyst material has a round shape.

Regarding Claim 11, Mancevski teaches sputtering for forming the catalyst layer as broadly recited. (*See Col. 8-9*)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,114,641 to Yamamoto et al.

Regarding Claim 8 Yamamoto et al. teaches the method of the invention substantially as claimed, but does not expressly teach outside diameter from at most 1%. However, since Yamamoto teaches reduction ration may vary (*7% 15% 90% etc, See examples*) one skilled in the art would have found it obvious at the time of invention to optimize the size for a particular application in the well known manner within the capabilities of the well known mechanical processing such as drawing, extrusion, rolling, forging etc.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,146,227 to Mancevski in view of JP 2003-277033 to Ono et al.

Regarding Claim 9, Mancevski teaches the method of the invention substantially as claimed, but does not expressly teach multilayer catalyst. Ono et al. teaches catalyst for nanotube may be multilayer. (See translated abstract provided) One skilled in the art would have found it obvious at the time of invention to use a multilayer catalyst as recited by Ono et al.

Claims 11 and 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,146,227 to Mancevski in view of U.S. Patent Application Publication 2004/0009115 to Wee et al.

Regarding Claim 11 and 12, Mancevski teaches the method of the invention substantially as claimed, but does not expressly teach mechanical polishing wherein an ion is entered into the catalyst material. However, the step of ion processing into a material is known in the nanotube fabrication art. For example, Wee et al. teaches catalyst for nanotube may be ion processed as broadly recited. One skilled in the art would have found it obvious at the time of invention to use an ion processed catalyst as recited by Wee et al. in order to modify nanotube properties as recited by Wee et al.

Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,146,227 to Mancevski in view of U.S. Patent 6,261,532 to Ono.

Regarding Claims 13-15 Mancevski teaches the method of the invention substantially as claimed, but does not expressly teach reducing gas and carbon or material gas is brought into contact. However,

the steps are known for growing a carbon nanotube from a catalyst. For example, Ono teaches reducing and carbon material gases are used to precipitate on (saturate) the catalyst. (*See Col. 1-4, examples and discussion*) It would have been obvious to one of ordinary skill in the art at the time of invention to use a reducing gas and material gas as recited in order to produce a carbon nanotube by catalyzed growth.

Allowable Subject Matter

Claims 2-6 would be allowable if rewritten to overcome the rejections under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action (by adding the limitations of Claim 7, for example) and to include all of the limitations of the base claim, and any intervening claims. For example the combination of the limitations of Claims 1, 7 and 2 may be recited in the same claim to provide allowable subject matter if rewritten to overcome the 112 rejections such as providing proper antecedent basis and positively reciting the steps and limitations.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (571) 272-1433. The examiner can normally be reached on Monday-Friday (9:00-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roberts Culbert/
Primary Examiner, Art Unit 1792